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U.S. Army Cold Regions Research and Engineering Laboratory
Hanover, New Hampshire 03755

ERTS-1 Project No. MMC-298

ARCTIC AND SUBARCTIC ENVIRONMENTAL
ANALYSES UTILIZING ERTS-1 IMAGERY

Third Bimonthly Progress Report

23 December 1972 - 23 February 1973

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(E73-10279) ARCTIC AND SUBARCTIC
ENVIRONMENTAL ANALYSES UTILIZING ERTS-1
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Objectives (Reference NASA Contract S-70253-AG dated 14 June 1972):

- * Analyze and map the sediment deposition in harbors, inlets, and docking facilities in the Cook Inlet.
- * Map the permafrost areas of Alaska as inferred by vegetative patterns. Compare major tonal and textural permafrost patterns with Mariner imagery.
- * Correlate the snowpack cover of Caribou-Poker Creek with stream runoff.
- * Map and inventory the icing on the Chena River.
- * Items 2 and 4 above are to be correlated with the University of Alaska studies in the same area.

Accomplishments:

Mapping was completed for a 59,000 square mile area in north central Alaska. Thematic maps produced included surficial geology, vegetation, permafrost, geologic lineations, and a composite temperature distribution map. Initial mapping for the Cook Inlet area included current patterns, water types, sediment distribution, sediment plumes, and tidal flats. An area of large scale patterned ground near Norton Sound was investigated for terrain analog analysis in conjunction with Mariner imagery of the Martian surface. Color composites were made of available ERTS scenes representative of various physiographic provinces of Alaska. These composites will be used in vegetation and permafrost mapping. Photo enlargements were made and basic mapping was begun for snowcover and icing studies on the Poker-Caribou Creeks watersheds near Fairbanks.

Activities planned for the next reporting period (23 February - 23 April) include: continued terrain analysis and mapping of areas representative of several physiographic provinces of Alaska, continued mapping and

analysis of near-shore marine processes in Cook Inlet, and preparation for field activities. Field and laboratory work will begin on correlations between snowpack observations and stream runoff on the Caribou-Poker Creeks watershed. The winter has not so far been conducive to the development of icings on the Chena River although there is still a possibility that significant icings will occur during March and April. Ground observations will continue to monitor this process.

Accomplishments and Their Significance to Practical Applications:

The thematic mapping done for a large portion of interior Alaska provides considerably more detail on the distribution of basic environmental parameters than was previously available. The mapping of sediment patterns in Cook Inlet will provide valuable information for the selection of new harbor sites, and the mapping of tidal flats in this area provides useful general navigational information. Information derived from terrain analogs between large scale Alaskan patterned ground features and Mariner imagery of Mars will be made available for consideration in site selection activities for the Viking Mars Lander in 1975.

Published Articles, Papers, Preprints, Abstracts:

Abstract: "Arctic and Subarctic Environmental Analysis Utilizing ERTS-1 Imagery and Data Collection Systems" by D. M. Anderson, H. L. McKim, L. W. Gatto, R. K. Haugen, C. W. Slaughter, and T. L. Marlar; to be presented at the University of Tennessee Remote Sensing of Earth Resources Conference.

Abstract: "Sediment Distribution and Coastal Processes in Cook Inlet, Alaska" by Anderson, Gatto, and McKim; to be presented at the ERTS-1 Symposium, Goddard Space Flight Center, Greenbelt, MD.

Problems: None

Changes in Standing Order Forms:

1 November 1972: Change coordinates to 69N, 169W; 72N, 158W; 71N, 141W; 59N, 141W; 56N, 154W; 60N, 169W; cloud cover 60% or better; quality fair. One each 9.5" positive transparencies all MSS bands.

Data Request Forms Submitted:

14 Dec 72 - Bulk B/W transparencies and prints, 70mm and 9.5 in.

18 Dec 72 - Bulk B/W transparencies and prints, 9.5 in.

20 Dec 72 - Bulk B/W transparencies and prints, 70mm and 9.5 in.

28 Dec 72 - Bulk B/W transparencies and prints, 70mm and 9.5 in.